

Cassini / Huygens Program
Archive Plan
for Science Data

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Change Record for 699-068

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Draft 3	9/16/98	Reorganization -- Updated signature page, replaced references to SO and DOI with the new "Instrument Operations Team", replaced references to MSO and Science Office with "Science Operations Office" Section 2, item 2 -- states that Cassini provides volumes to PDS CN who in turn provides copies to the relevant PDS DNs. It should be noted that this is still listed as a TBD Incorporated PDS comments	All
Draft 4	10/5/98	Section 2, item 5 Added cruise archive policy & included in delivery of cruise science in Archive schedule OTLs and MSOCs listed as archive contacts for each instrument	All
Preliminary	4/1/99	Changed document title Revised signature page Changed instances of "Cassini Project" to "Cassini Program" Updated applicable document listing	All
Preliminary V1	12/27/99	Updated Signature page Major changes to Roles and Responsibility section 2.0 Some changes to policy section 3.0 Review and comment on To be Supplied list Formatting changes	All
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Revision No.	Date	Changes	Sections Affected
Initial Release, Version 1	8/3/00	Higher level product archive.	6.4
Version 2 UNSIGNED	8/12/02	<p>Clarified Policies</p> <p>Clarified Roles and Responsibilities</p> <p>Updated products list</p> <p>Updated archive contacts</p> <p>Added Huygens archive contacts</p> <p>Added Huygens Products list</p> <p>Added Mission and instrument overview</p> <p>Moved CODMAC data level to NASA levels table to appendix.</p> <p>Removed data level references from document in lieu of descriptions of products.</p> <p>Added Peer Review and Validation Process</p> <p>Clarified archive terms</p> <p>Removed Data Flow that appeared to cause confusion.</p> <p>Added standard values for PDS High-Level Catalog files</p> <p>Added PDS label keyword requirements section.</p> <p>Added coordinate system designations.</p> <p>Clarified roles and responsibilities.</p> <p>Added a detailed data delivery schedule.</p>	All.
Version 3	6/04	<p>Incorporate many editorial changes requested by reviewers of version 2:</p> <p>Updated Mission overview to correct tense.</p> <p>Updated Dist list and acronym list.</p> <p>Updated Contacts list.</p> <p>Updated Appendices.</p> <p>Added Huygens Archive Plan to Appendix.</p> <p>Added Cassini data volume Section.</p> <p>Changed policy of when pipeline production should be ready.</p> <p>Added data distribution section.</p> <p>Added/Clarified definitions of terms.</p> <p>Updated Press Release products section.</p> <p>Added Requirements section.</p> <p>Eliminated reference to the MIFT. The SAWG will perform the production coordination function.</p> <p>Defined "Cassini Program" in scope.</p> <p>Merged sections 9 and 10.</p>	All

TBDs

ITEM	Related section
Standard keywords for labels and index files. (MASTER INDEX)	9.2.2

Distribution List

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Adams, Steven	PDS CN	Kellock, Steve	MAG
A'Hearn, Mike	PDS	Kempf, Sascha	CDA
Alanis, Rafael	JPL/IMG	Kirk, Randy	USGS/IMG
Anabtawi, Aseel	RSS	Kliore, Arv	RSS
Anderson, Theresa	SE	Krimigis, Tom	MIMI
Armstrong, Thomas	FTECS	Kunde, Virgil	CIRS
Arvidson, Ray	PDS/GEO	Kurth, Bill	RPWS
Asmar, Sami	RSS	LaVoie, Sue	JPL, Imaging
Atkinson, Dave	Huygens	Lebreton, Jean-Pierre	Huygens
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Colombatti, Giacomo	HASI	Rappaport, Nicole	RSS
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Eliason, Eric	USGS/IMG	Simpson, Richard	PDS Radio Science
Elson, Lee	NAIF	Slootweg, Peter	MAG
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Furman, Judy	CAPS	Stiles, Bryan	RADAR
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Gautier, Daniel	IDS	Sykes, Mark	SBN/DUST
Gell, David	INMS	Tingley, Jim	CIRS
Goltz, Gene	RSS	Waite, Hunter	INMS
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1 Introduction

1.1 Purpose

This document describes the Cassini / Huygens Program plan for generating, validating, and delivering data products to the Planetary Data System (PDS). Included are the policies, guidelines and requirements that will be followed by instrument teams in the generation of PDS compliant archives. It provides a high-level description of science and SPICE datasets, data size estimates, and a delivery schedule that can be used by the PDS for planning purposes.

A high-level overview of the mission and instrumentation is included to provide context to the archiving discussion.

1.2 Scope

This document is applicable to all science and supplementary data resulting from Cassini Program investigations. The Cassini Program includes the Cassini (orbiter) and Huygens (probe), which are referred to in this document collectively as "Cassini." Although the content of this document applies to both projects, additional details for Huygens are provided in the Appendix D of this document.

Separate agreements, established through the Cassini Program Science Group (PSG) and Huygens Science Working Team (HSWT), address data sharing policies.

Each team's data delivery methods are described in team Software Interface Specifications (SISs).

This document is subordinate to the Cassini Program Data Management Plan and Science Management Plan.

1.3 Applicable Documents

The Cassini / Huygens Archive Plan for Science Data (APSD) is responsive to the following program documents found on-line in the Master Controlled Document Library at <https://cassini.jpl.nasa.gov/mcdl>

- a) Cassini Operations System Functional Requirements Document, 699-500-3-GS/R
- b) Cassini Program Science Management Plan (SMP), D-9178, PD 699-006, July 1999.
- c) Cassini Program Data Management Plan (PDMP), D-12560, PD 699-061, Rev.B, April 1999.
- d) Cassini/Planetary Data System Interface Requirements Document (MSO - PDS IRD), PD 699-108, Rev. B, 14 April 1998.
- e) Huygens Data Archive Generation, Validation and Transfer Plan, HUY-RSSD-PL-001, DRAFT, June 2004.

The following PDS documentation, that is referred to in this document, is available on-line from the PDS Website at <http://pds.jpl.nasa.gov/> .

- f) Planetary Data System, Data Preparation Workbook, February 17, 1995, Version 3.1, JPL D-7669, Part 1
- g) Planetary Data System, Standards Reference, August 1, 2003, Version 3.6, JPL D-7669, Part 2
- h) Planetary Science Data Dictionary Document, August 28, 2002, JPL D-7116, Rev. E

1.4 Document Change Control

The APSD is under change control once all parties sign it. All signatories must approve each published revision. The Appendix A is a living part of this document. It will be updated periodically and made available as new products are identified.

2 Mission Overview

The Cassini spacecraft is a combined Saturn orbiter and ESA Huygens Titan atmospheric probe. The orbiter is a three-axis stabilized spacecraft equipped with twelve instruments. The probe has six instruments designed to study the atmosphere and surface of Titan.

Cassini was launched on 15 October 1997 using a Titan IV/Centaur launch vehicle with Solid Rocket Motor Upgrade strap-ons and a Centaur upper stage. A Venus-Venus-Earth-Jupiter Gravity Assist trajectory was used to reach Saturn in 6.7 years. Science was limited during the cruise phases due to restricted spacecraft and instrument flight software capabilities and cost constraints. Cruise periods were used to check out instrument operations and gather instrument calibration data. Magnetosphere and Plasma Science data were collected nearly continuously beginning in February 2000. Following the Jupiter flyby, the spacecraft was used to search for gravitational waves using its Ka-band and X-band radio equipment.

Science activities increased in intensity six months before arriving at Saturn. On 11 June 2004, just prior to Saturn Orbit Insertion (SOI), instruments observed the small outer moon Phoebe. During SOI on 1 July 2004 (GMT) the spacecraft will make its closest approach to the planet's surface at an altitude of only 0.3 Saturn radii (18,000 km). The approximately 90-minute SOI burn required to place Cassini in orbit around Saturn will be executed earlier than its optimal point centered around periapsis and instead will end near periapsis. This will allow science observations to be taken during this unique opportunity to gather data while passing through the ring plane.

The Huygens probe will be released from the orbiter on 24 December 2004, (11 days after the second Titan flyby). Two days after the probe is released the orbiter will perform an orbit deflection maneuver to place itself on the proper trajectory for the next Titan encounter. At the third Titan flyby, on 14 January 2005, the probe will descend through the atmosphere of Titan and relay data to the orbiter for up to 2.5 hours during its descent to the surface. The orbiter will continue to tour the Saturn system, which includes multiple close Titan flybys for gravity assists and science acquisition. Targeted and non-targeted flybys of selected icy satellites will be used to determine surface compositions and geologic histories. Cassini's orbital inclination will vary widely to facilitate investigations of the field, particle, and wave environment at high latitudes, including the hypothesized source of the unique Saturn kilometric radiation. High inclinations also permit high-latitude Saturn radio occultations, viewing of Saturn's polar regions, and more nearly vertical viewing of Saturn's rings. The baseline mission is scheduled to end mid 2008, for a total mission duration of 10.7 years.

3 Science Instruments Overview

3.1 Cassini Orbiter Science Instruments

The Cassini orbiter hosts twelve science instrument subsystems briefly described in the table below. CAPS, CDA, and the MIMI LEMMS detector are capable of some limited articulation independent of the spacecraft pointing.

CAPS	Cassini Plasma Spectrometer	in-situ study of plasma within and near Saturn's magnetosphere.
CDA	Cosmic Dust Analyzer	in-situ study of dust grains in the Saturn system.
CIRS	Composite Infrared Spectrometer	spectral mapping to study temperature and composition of surfaces, atmospheres, and rings within the Saturn system.
ISS	Imaging Science Subsystem	multispectral imaging of Saturn, Titan, rings, and icy satellites to observe their properties.
INMS	Ion and Neutral Mass Spectrometer	in-situ study of compositions of neutral and charged particles within the Saturn magnetosphere.
MAG	Magnetometer	study Saturn's magnetic field and interactions with the solar wind.
MIMI	Magnetospheric Imaging Instrument	global magnetospheric imaging and in-situ measurements of Saturn's magnetosphere and solar wind interactions.
RADAR	Radio Detection and Ranging	synthetic aperture RADAR (SAR) imaging, altimetry, and radiometry of Titan's surface.
RPWS	Radio and Plasma Wave Science	study plasma waves, radio emissions, and dust in the Saturn system.
RSS	Radio Science Subsystem	study atmospheres and ionospheres of Saturn and Titan, rings, and gravity fields of Saturn and its satellites. During cruise, RSS also made investigations into solar plasma and relativity, and searched for gravitational waves.
UVIS	Ultraviolet Imaging Spectrograph	investigate the chemistry, aerosols, clouds, and energy balance of the Titan and Saturn atmospheres; neutrals in the Saturn magnetosphere; the deuterium-to-hydrogen ratio for Titan and Saturn; icy satellite surface properties; and the structure and evolution of Saturn's rings.
VIMS	Visible and Infrared Mapping Spectrometer	spectral mapping to study the composition and structure of surfaces, atmospheres, and rings.

3.2 Huygens Probe Science Instruments

There are six science instrument subsystems on the Huygens Probe. The science instruments are listed below along with their measurement objectives.

ACP	Aerosol Collector and Pyrolyser	collect aerosols for GCMS to analyze their chemical compositions.
DISR	Descent Imager / Spectral Radiometer	multi-sensor optical instrument capable of imaging and making spectral measurements over a wide range of the optical spectrum.
DWE	Doppler Wind Experiment	measures wind direction and velocity using Probe-Orbiter radio link.
GCMS	Gas Chromatograph Mass Spectrometer	identifies and quantifies the abundances of the various atmospheric constituents.
HASI	Huygens Atmospheric Structure Instrument	multi-sensor instrument, intended to measure the atmosphere's physical properties, including its electrical properties.
SSP	Surface Science Package	a suite of simple sensors for determining the physical properties of the surface at the impact site and for providing unique information on the composition of the surface material.

4 Archive Terms Defined

Ancillary Data – Data that are needed to generate calibrated or resampled data that may come from sources other than the science instrument.

Archive – An archive consists of one or more datasets along with all the documentation and ancillary information needed to understand and use the data. An archive is a logical construct independent of the medium on which it is stored.

Archive Medium - A physical device for storing data such as CD or DVD. For PDS archives, the medium must be approved by PDS as described in the PDS Standards Reference.

Archive System – The archive system comprises hardware, software, procedures, interfaces, and personnel necessary to complete the archiving of science and ancillary data with the PDS.

Archive Volume, Archive Volume Set – A volume is a unit of medium on which data products are stored; for example, one CD-ROM. An *archive volume* is a volume containing all or part of an archive, that is, data products plus documentation and ancillary files. When an archive spans multiple volumes, they are called an *archive volume set*.

Data Product – A labeled grouping of data resulting from a scientific observation. A product label identifies, describes, and defines the structure of the data. An example of a data product is a planetary image, a spectrum table, or a time series table accompanied by its PDS label.

Dataset – An accumulation of data products together with supporting documentation and ancillary files.

Data Object - A data object is that portion of a data product that contains the actual data. It is described in a data object definition within a PDS label; it is tangible, and can be physically accessed and manipulated. For example the data object T142836.DAT could be described in a PDS label using the following keywords. Additional keywords would fill in the "... " lines.

```
^TABLE = "T142836.DAT"  
...  
OBJECT = TABLE  
ROWS = 1028  
...  
END_OBJECT = TABLE
```

Metadata - A label or file that describes one or more science data objects or products.

PDS - Planetary Data System. The primary organization within NASA responsible for the archive of planetary science data obtained from NASA sponsored missions. The PDS consists of a Central Node located at JPL and several Discipline Nodes located around the country.

SAWG - The Science Archive Working Group includes instrument teams, PDS Nodes, and Project representatives. The group is chartered to coordinate the archive system development and coordinate production.

Science Data – All data acquired that are used to accomplish primary science goals of the Cassini Orbiter and Huygens Probe science teams.

SIS – Software Interface Specification. Describes the volume organization, data file structures, label contents, and operational procedure for delivering data archives.

Standard Data Product – A data product that has been defined that is contractually required by the PI or TL as part of the investigation. Standard data products are generated in a predefined way, using well-understood procedures, and processed in "pipeline" fashion.

5 Cassini Data Volume Estimates

5.1 Cassini Orbiter

Raw Science Downlinked Data Volume:

Full Mission Success: 95% of the data transmitted from the spacecraft is received on the ground.
Calculations are rounded, and assume one 9-hour pass per day, and full mission success as described above.

Prime Mission (1643 days):

X-Band, 30% passes to 70-m antenna (4Gbit/pass) total 2060 Gbits
X-Band, 70% passes to 34-m antenna (1Gbit/pass) total 1045 Gbits

Extended Mission (730 days):

X-Band, 30% passes to 70-m antenna (4Gbit/pass) total 915 Gbits
X-Band, 70% passes to 34-m antenna (1Gbit/pass) total 465 Gbits

Dataset Volume Estimates:

Prime Mission:

Cassini Capability in Science Phase Prime Mission (Jan 2004 – Jul 2008)
3 Tbits of raw telemetry data based upon prime mission downlink capability
From Cassini Data Archive Plan: (26.1 Tbits + 2.1 Tbits RSS) = **28.2 Tbits** total

TLM Expansion factor = $26/3 = 8.6$

Extended Mission:

Cassini Capability in Science Phase Extended Mission (Jul 2008 – July 2010)
If that data were reduced as before (same expansion factor):

1.3 Tb raw telemetry data based upon extended mission downlink capability
($1.3 * 8.6$) = 11.6 Tbits + 1.1 Tbits RSS = **12.7 Tbits**

Grand total for the primary and extended missions : **40.9 Tbits**

Recommend PDS size their system to accept, at a minimum, **41 Tbits** of data from the Cassini prime and extended missions.

5.2 Huygens Probe

The raw data volume for Huygens is approximately 173.1 Mbits. The reduced data volume has not been calculated.

6 Validation

This section describes the validation process for Cassini Orbiter datasets. Huygens probe dataset validation is described in appendix D.

There are pre-production and production validation activities. Pre-production validation includes a project design peer review, followed by a PDS peer review. Production validation for science usability is best achieved through science data analysis using the archive products. Production validation for format includes built in quality control to ensure archives comply with the Software Interface Specification (SIS).

6.1 Project Design Peer Review

The project design peer review provided an assessment of instrument archive designs and allowed instruments to proceed with production software design. Ray Walker, the PDS PPI Node Manager, chaired the review. Other members included representatives from instrument teams, science teams, and PDS. Requests for action were gathered and responded to.

The review board was asked to evaluate designs to determine if:

1. List of data products identified for archive was complete.
2. Calibration methods are understood.
3. Mission consistent attributes are used in data labels. For example: time, latitude, longitude, coordinate systems, and reference frames.
4. Data labels provide the information necessary to narrow searches on data products.
5. Validation process is described and specifically assigns responsibilities.
6. Delivery mechanism is understood.
7. Liens are identified with resolution plans.

6.2 PDS Peer Review

The PDS Discipline Node (DN) assigned to an instrument team coordinates and leads a peer review of a sample volume. Members of the PSG will be asked to participate in peer reviews as well as members of the science community outside the PSG. The peer review is used to ensure the archive contains all the components needed to perform science analysis, and is prepared as documented in the Software Interface Specification (SIS). The PDS DN documents all liens and their closures.

Success Criteria:

1. All liens are resolved and the SIS is updated as necessary and signed.
2. The supporting documentation is comprehensive and complete to support science analysis.
3. Calibration and other data processing algorithms are provided in a way that ensures data access and algorithms can be implemented in future programming languages and computing environments.
4. If calibrated data are not provided, sample calibrated data must be provided for users to verify correct implementation of algorithm(s).

6.3 Production Validation

Each team in coordination with the PDS DN will develop the validation process used during production of datasets and document their validation plan in their SIS. Production validation for science usability through data use is encouraged. PDS will provide teams with tools as needed for validating products for PDS compliance. The PDS DN will hold peer reviews as necessary.

7 Delivery to PDS

Cassini orbiter archive datasets will be provided to PDS by the instrument teams either electronically or on physical media as negotiated between individual instrument teams, the program archive data engineer and the PDS. The agreed to delivery method and volume organization will be documented in Software Interface Specifications (SISs). The delivery schedule for all level 1A & level 1B (CODMAC 2 & 3) is defined in appendix B of this document.

Please refer to appendix D for the Huygens PDS transfer plan.

8 Distribution

PDS archives will be accessible to the public on-line. The PDS on-line system will provide search filters, such as time range or target name, so that a user can retrieve data that meet specific search criteria. Map coordinate based searches will be supported as appropriate for higher-level products. Data will be made available via electronic transfer or on physical media. The NSSDC will be responsible for replication and distribution of large volumes of data on appropriate physical media.

9 Archive Policies, Guidelines and Requirements

Archive policies, guidelines and requirements have been developed to ensure data products meet PDS standards and support collaborative studies among Cassini Orbiter and Huygens Probe data.

9.1 Policies

- 1) Cassini is committed to archiving data products as summarized in Section 9.3.1 of this document.
- 2) Instrument teams will produce archives that adhere to the PDS standards version specified in their SISs.
- 3) Each instrument team will be assigned to one primary PDS science discipline node to design and deliver its archives. Primary nodes should ensure the requirements of the secondary PDS science discipline node are met.
- 4) Data distribution will be done by PIs, TLs, or IDSs through their science team interfaces or the PDS after archives are released.
- 5) Cassini orbiter production pipelines will be complete and validated by March 2005, unless specifically approved otherwise by the project.
- 6) SPICE files that are used in the processing of archive products may be included on archive volumes, but are not required if they are the standard products produced and delivered to the program database. If SPICE files are used in processing that are not delivered to the program database then those files must be included on instrument archive volumes.
- 7) Although not required, higher-level products developed by PIs, TLs, and IDSs may be archived with the PDS, if resources are available to do so. Cassini recognizes those higher-level products are valuable and should be preserved, however funding restrictions may preclude the complete archiving of these products.
- 8) Cassini will provide a regular forum for discussing archive progress and issues with the PDS, PIs, and TLs.

9.2 Guidelines

9.2.1 Designation of Coordinates

A global reference system for a given body consists of several elements. These may include a) a cartographic coordinate system, b) a specified reference surface and its dimensions, and c) orientation information for the coordinate system.

The International Astronomical Union (IAU) and International Association of Geodesy (IAG) sponsor a “Working Group on Cartographic Coordinates and Rotational Elements of the Planets and Satellites” which sets standards in this area. The latest version of their recommendations is available as Seidelmann, et al., *Celestial Mechanics and Dynamical Astronomy*, 82, pp. 83-110, 2002.

For all planetary bodies, the IAU allows two possible types of coordinate systems, planetocentric and planetographic, (ibid, pp. 100-101). In both systems, the origin is the center of mass of the body in question. The rotational pole of the body which lies on the north side of the invariable plane of the solar system (the ecliptic) will be called north, and northern latitudes will be designated as positive.

The planetocentric coordinate system is a right-hand spherical coordinate system in which latitude is defined as the angle between a vector passing through the origin of the spherical coordinate system and the equator, and longitude is the angle between the vector and the plane of the prime meridian measured in an eastern direction. Although this system is consistent with right hand coordinates commonly used to formulate physical problems, historical astronomers used a system in which longitude increased with time.

The Cassini Mission will continue the tradition established through historic telescopic observations. A planetographic system will be used. The longitude in such a system is specified so that the longitude of the central meridian, as observed from a fixed direction in inertial space, will increase with time, and range from 0° to 360°. This results in longitudes being measured positively to the west when the body’s rotation is prograde, and to the east when the body’s rotation is retrograde. Jupiter, Saturn and all satellites rotate in the prograde sense; therefore, all longitudes will be West Longitude.

According to the IAU, a planetographic system requires a reference surface and the latitude is specified for a point on the reference surface as the angle between the equatorial plane and the normal to the reference surface at that point. Either a sphere or rotational ellipsoid is used. The WG notes that some bodies (e.g., Io, Mimas, Enceladus, and Miranda) could be well represented by a triaxial ellipsoid, but in practice a sphere will be used due to computational difficulties. Likewise for computational convenience a sphere is often used for irregularly shaped bodies.

The IAU has not defined East Longitude for the Giant Planets and traditionally either planetographic (based on the local normal) or planetocentric (a spherical coordinate system) latitude has been used with West Longitude. Thus, For Jupiter and Saturn, depending on the observational goals, either a spherical or an ellipsoidal reference surface with given equatorial and polar radii will be used and indexes will include both centric and graphic latitudes.

In order to specify the orientation of a planetary body at a given instant, the WG provides recommended equations which specify the position of the body’s celestial pole (in right ascension and declination at the epoch J2000.0), and the orientation on its axis, by W , the angle along the equator to the east between the prime meridian and the equator’s intersection with the celestial equator.

The prime meridian itself can be specified in several ways. Where possible it is specified by defining the longitude of the center of some small surface feature near the body’s equator. If a body is tidally locked to its parent body, the prime meridian is usually that longitude passing through the average sub-planetary (parent body) point. If a body has no fixed surface features, the equation for W is chosen so as to define an arbitrary prime meridian.

The reference radius (for a spherical reference surface) or reference equatorial and polar radii (for an ellipsoidal reference surface) will be included in the labels of data from remote sensing instruments. The reference radius should be included in MAPS labels where range is expressed in radii. Currently recommended (mean) radii and

reference ellipsoidal radii, and definitions for orientation are available in the latest NAIF CASSINI PCK file. These are initially the IAU/IAG WG recommended values but may be updated as the mission progresses. The location of the prime meridian for each body is defined by the equation for the value of W , unless fixed surface features have been identified in the past. For such bodies a named crater and its defined longitude are specified in the IAU/IAG WG report (Table 2, footnotes).

Ring coordinates are given in terms of radius from Saturn's center of mass in kilometers and longitude measured in degrees from 0 to 360 in the celestial reference frame at J2000.0 (the ICRF). Radii are measured from the center of the planet along the nominal ring plane. The inertial longitude of a ring feature is measured relative to the ring prime meridian (different from Saturn's prime meridian) where the ring prime meridian passes through the ascending node of the Saturn's invariable plane (equivalent to the equatorial plane in this case) on the celestial equator at J2000.0. Longitudes are measured in the direction of orbital motion along the Saturn's invariable plane to the ring's ascending node, and thence along the ring plane.

9.2.2 PDS Label and Index Keywords

PDS labels and index files provide searchable keys and describe characteristics of the products. Index files are used to populate the PDS search catalog. PDS requested keywords for index files are detailed in TBD. If it is not possible for Cassini to provide values for keywords due to funding limitations, then the keywords will be included with NULL values.

9.2.3 Standard Designation of Time

There should be a consistent representation of time used in filenames, directory names, labels, and index files.

The time of data acquisition (written to memory or telemetry stream) should be expressed as spacecraft UTC (coordinated universal time) or Earth UTC for Radio Science data. Other representations of time may also be included in labels and index files. In the case of in-situ instrument data, if the instrument samples are filtered (digital, analog, or both) or averaged, the magnitude of the filters/average delays (may be telemetry rate dependent) should be described in the dataset documentation. Raw data that are sampled synchronously with the spacecraft clock should also contain the spacecraft clock value (SCLK). SCLK values are irrelevant if the instrument sampling is asynchronous, (as is the case for MAG), or nonexistent (as is the case for RSS).

If data files are in binary format, and the overhead of including a 21-byte time tag increases the file storage requirements beyond reason (doubles the size), then an 8-byte binary floating-point representation of the Ephemeris Time (Barycentric Dynamical Time) consistent with the output of the SPICE Toolkit UTC2ET function is an acceptable alternative. These values can be converted back to the ASCII format by using the SPICE Toolkit function ET2UTC with the appropriate string format specification.

Format descriptions:

The Cassini UTC system format formation rule is: YYYY-DDDThh:mm:ss[.fff]

Spacecraft clock count (SCLK) format is NNNNNNNNNN.NNN

9.3 Requirements

9.3.1 Minimum Science Data Archive

Cassini is committed to archiving full resolution uncalibrated data products, calibration files, algorithms for applying calibration, and sample calibrated data. See Appendix A of this document for the list of orbiter products and Appendix D for the list of probe products planned for archive.

Below is a summary of the science data archive requirement specified in Cassini Operations System Functional Requirements Document, 699-500-3-GS/R.

Instrument teams shall produce validated PDS compliant science data archives that contain:

- Uncalibrated full resolution data
- Calibration files
- Algorithms for applying calibration and any other data processing which is critical to use the data.
- Sample calibrated data files for future users to verify their application of calibration algorithms.
- Metadata as specified by PDS Standards.
- Documentation that describes the instrument and dataset and anomalies that affect the archive data products.
- A searchable index that provides access to data products (at a minimum, this implies access through a simple set of keys, such as data source identification, data product type, time, geometry, or target).

Note: The Instrument Operations (IO) team generates data products for VIMS, ISS, RS, and RADAR Facility Instruments. IO produces data products according to TL-approved Software Interface Specifications (SISs) and Operational Interface Agreements (OIAs). TLs are encouraged to negotiate with IO to use PDS formats for these products. TLs are responsible for archive volume generation and validation. TLs will be required to reformat products to PDS standards if IO creates products that are not PDS compliant.

9.3.1.1 Raw Telemetry Data

There is no plan to archive raw telemetry data with PDS other than what is required for Radio Science. Cassini Mission Science and Support Operations (MSSO) Office has a requirement to store raw telemetry data that includes engineering, science and housekeeping packets in the form of raw telemetry frames through End-of-Mission + 1 year.

9.3.1.2 Higher Level Science Data Products

PI and TL teams and Interdisciplinary Scientists (IDSs) generate higher-level science products. Although not contractually required, it is expected that higher-level data products developed by PIs, TLs, and IDSs in the course of doing their data analysis will be archived with the PDS. Cassini recognizes that higher-level products are valuable and should be preserved; therefore, a joint effort between Cassini and PDS will be made to facilitate the generation of such products in PDS compliant formats, thereby minimizing any additional effort that might occur in accomplishing this objective.

9.3.1.3 Public Release Data Products

Public released products will be generated in accordance with Cassini/JPL/NASA policies and procedures for public information and press releases. All press release products will be archived with the PDS by the data producers.

9.3.1.4 SPICE Data Products and Toolkit

The Instrument Operations Team is responsible for generating the archive of SPICE datasets. Final versions of SPICE (SPK, PCK, IK, FK, CK, EK, SCLK, and LSK) files will be archived by the PDS NAIF node in big-endian IEEE binary and text formats, as appropriate, with accompanying documentation. The SPICE toolkit will always be available on line from the NAIF node of the PDS, for all platforms supported by NAIF, including MAC, PC/Windows, PC/Linux, and Sun/Solaris. Copies of each toolkit version are delivered to the NSSDC.

9.3.2 Documentation

Documentation relevant to understanding the archive will be delivered to PDS. At a minimum documentation should include:

- a) Software Interface Specifications (SISs) that define the format and content of data files and volume organization.
- b) Calibration and data processing algorithms necessary to use the data.
- c) Instrument catalog file that describes the instrument capabilities and operations (INST.CAT).
- d) Dataset description files (DATASET.CAT).
- e) References to publications that are relevant to the data (REF.CAT).
- f) Listing of personnel involved in the dataset generation (PERS.CAT).

9.3.3 Software

It is expected that standard data products delivered by the PI or TL will be in a format that is accessible by other users. If the products cannot be accessed using commonly available software tools, then the products should be accompanied by software, source code, and documentation or detailed algorithms that allow a user to access the data.

9.3.4 PDS High-Level Catalog Files

PDS high-level catalog files will be included in the CATALOG directory of archive volumes, as defined in JPL D-7669, Planetary Data System Standards Reference. High-level catalog files include Mission, Instrument Host, Instrument, Dataset, Reference, and Personnel catalog files.

IO provided a draft version of the Mission, Instrument Host, and Mission Reference files to PDS for catalog ingestion at SOI-1 year. Updates to these files will be provided at least every two years if new information is available. Final versions will be provided no later than two months prior to end of mission.

Archive producers will provide Instrument, Dataset, Personnel, and Reference catalog files with their archive submissions. The Cassini Archive Coordinator will generate team specific reference files with input from science teams.

The Cassini Project Archive Coordinator will maintain the mission reference catalog file that includes references found in the MISSION.CAT file.

Keyword Values defined for the mission that should be used in PDS objects include:

MISSION_NAME	= "CASSINI-HUYGENS"
INSTRUMENT_HOST_ID	= "CO"
INSTRUMENT_HOST_NAME	= "CASSINI ORBITER"
MISSION_ALIAS_NAME	= "CASSINI"
INSTRUMENT_HOST_ID	= "HP"
INSTRUMENT_HOST_NAME	= "HUYGENS PROBE"
MISSION_ALIAS_NAME	= "HUYGENS"

Keyword values for INSTRUMENT_ID and INSTRUMENT_NAME are as follows:

INSTRUMENT_ID	INSTRUMENT_NAME
CAPS	CASSINI PLASMA SPECTROMETER
CDA	COSMIC DUST ANALYZER
CIRS	COMPOSITE INFRARED SPECTROMETER
INMS	ION AND NEUTRAL MASS SPECTROMETER
ISSNA	IMAGING SCIENCE SUBSYSTEM NARROW ANGLE
ISSWA	IMAGING SCIENCE SUBSYSTEM WIDE ANGLE
MAG	MAGNETOMETER
MIMI	MAGNETOSPHERIC IMAGING INSTRUMENT
RADAR	RADAR
RPWS	RADIO AND PLASMA WAVE SCIENCE
RSS	RADIO SCIENCE SUBSYSTEM
UVIS	ULTRAVIOLET IMAGIN SPECTROGRAPH
VIMS	VISUAL AND INFRARED MAPPING SPECTROMETER
ACP	AEROSOL COLLECTOR PYROLYSER
DISR	DESCENT IMAGER / SPECTRAL RADIOMETER
DWE	DOPPLER WIND EXPERIMENT
GCMS	GAS CHROMATOGRAPH MASS SPECTROMETER
HASI	HUYGENS ATMOSPHERIC STRUCTURE INSTRUMENT
SSP	SURFACE SCIENCE PACKAGE

9.3.5 Filename and Directory name Maximum Lengths

Filenames will adhere to ISO 9660 level 2 specifications that allow the total filename length of 31 characters.

9.3.6 Volume Naming

The following is a constant that shall be used across the Cassini mission.

VOLUME_SERIES_NAME = "MISSION TO SATURN"

Volume IDs can contain up to 11 characters and shall use the following convention:

COIII_NNNN, for orbiter data.

HPIII_NNNN, for probe data.

Where :

CO = Cassini Orbiter

HP = Huygens Probe

III = Instrument acronyms up to 4 characters in length (CAPS, CDA, CIRS, INMS, ISS, MAG, MIMI, RADR, RPWS, RSS, UVIS, VIMS, ACP, DISR, DWE, GCMS, HASI, SSP)

NNNN = volume number

10 Roles and Responsibilities

10.1 Principal Investigators (PIs), Team Leaders (TLs)

The following responsibilities apply:

- a) Works directly with assigned PDS Discipline Nodes to define dataset content and format. (Discipline Nodes have expertise in archiving specific types of data and will help define file formats, keywords and standard values for keywords in metadata such as a dataset description file and data product label files.)
- b) Provides PDS with datasets that include data products (includes labels), other metadata that include Instrument, Dataset, Reference, and Personnel high-level catalog files, and ancillary data necessary to understand the data.
- c) Provides PDS with archive science datasets that are validated for science content and PDS format compliance with documentation, calibration and other data processing algorithms that ensure data access. (The list of these datasets can be found in Appendix A)
- d) Participates in Science Archive Working Group (SAWG) Meetings.
- e) Participates in peer reviews.
- f) Reports archive status to Instrument Operations (IO) by providing metadata that details submissions to PDS.

10.2 Interdisciplinary Scientists (IDSs)

- a) Archives any significant new science data products and associated metadata and supplementary products created from the investigation. These will likely be higher-level products and few in number. IDSs will inform the Cassini Archive Coordinator of archive plans.
- b) Participates in peer reviews.

10.3 Instrument Operations (IO) Program Archive Data Engineer

- a) Coordinates archive dataset design and production schedule.
- b) Maintains the Archive Plan for Science Data (699-068).
- c) Participates in peer reviews.
- d) Acts as agent between PDS, Project and PI and TL when necessary to resolve PDS format and delivery issues.
- e) Leads the Science Archive Working Group (SAWG) Meetings.
- f) Receives metadata describing archive submissions from instruments.
- g) Tracks and reports archive status to program weekly.
- h) Produces and validates SPICE data product archive as specified in Appendix A.
- i) Produces Mission, Instrument Host, and reference catalog files and provide to PDS.

10.4 Spacecraft Operations & Navigation

Generate and validate certain SPICE data products as specified in Appendix A. Assist IO in identifying the files that should be included in the SPICE archive.

10.5 Planetary Data System (PDS)

Central Node (CN):

- a) Coordinates the definition and production of the archives and ensures they are compatible with PDS standards.
- b) Maintains a database of all PDS holdings, which will be updated after Cassini archive volumes have completed the peer review process.
- c) Makes archive volumes available to the science community.
- d) Provides archive volume validation tools, consultation, and review of validation reports.
- e) Provides PDS training and instruction to archive volume producers.
- f) Participates in Science Archive Working Group (SAWG) Meetings.
- g) Provides copies of archive volumes to the NSSDC.

Lead Node(LN)

- a) Coordinates interactions between instrument teams and specific discipline nodes.
- b) Monitors the development of Cassini data base of PDS holdings and ensures its completion by the DNs.
- c) Ensures consistency across nodes with regard to data formats, labels, indexes, documentation, and calibration practices.
- d) Participates in peer reviews, monitors progress, and works with participants as needed to resolve issues.
- e) Designs PDS Master index. Validates that SIS's provide data to populate.

Primary Science Discipline Nodes (DN):

- a) Works with archive producers to define archive format and content.
- b) Leads peer reviews.
- c) Maintain archive of released Cassini products for access by the science community.
- d) Provides additional archive volume validation tools as needed.
- e) Participates in Science Archive Working Group (SAWG) Meetings.
- f) Produces physical volumes, if negotiated with team to do so.

10.6 National Space Science Data Center (NSSDC)

NSSDC ensures the long-term preservation of data. The NSSDC is also be responsible for filling large delivery orders to the science community, and making data available to foreign investigators, educators, and the general public.

11 PDS Discipline Nodes Contacts

PDS Node	Contact	Email	Phone Number
Central Node (CN) JPL, Pasadena, CA	Steven Adams	Steven.Adams@jpl.nasa.gov	(818) 354-2624
Atmospheres Node (ATM) New Mexico State University, Las Cruces, NM	Lyle Huber Reta Beebe	Lhuber@NMSU.edu Rbeebe@nmsu.edu	(505) 646-1862 (505) 646-1938
Geosciences Node (GEO) Washington University, St. Louis, MO	Ray Arvidson	arvidson@wunder.wustl.edu	(314) 935-5609
USGS Imaging Subnode (IMG/USGS) Flagstaff, AZ	Lisa Gaddis Patty Garcia	lgaddis@usgs.gov pgarcia@usgs.gov	(928) 556-7053 (928) 556-7246
JPL Imaging Subnode (IMG/JPL) JPL, Pasadena, CA	Sue Lavoie Rafael Alanis	Susan.K.LaVoie@jpl.nasa.gov Rafael.Alanis@jpl.nasa.gov	(818) 354-5677 (818) 354-8959
Planetary Plasma Interactions Node (PPI) University of California, Los Angeles, CA	Ray Walker Steve Joy	rwalker@igpp.ucla.edu sjoy@igpp.ucla.edu	(310) 825-7685 (310) 825-3506
Rings Node (RINGS) Ames Research Center, Moffet Field, CA	Mark Showalter Mitch Gordon	showalter@ringside.arc.nasa.gov mgordon@mail.arc.nasa.gov	(650) 604-3382 (650) 604-2529
Small Bodies Node (SBN), Dust Subnode University of Arizona, Tucson, AZ	Mark Sykes	sykes@as.arizona.edu	(520) 621-5381
Navigation and Ancillary Information Facility (NAIF) JPL, Pasadena, CA	Lee Elson	Lee.Elson@jpl.nasa.gov	(818) 354-4223
Radio Science Subnode (RS) * Stanford University, Stanford, CA	Dick Simpson	rsimpson@magellan.stanford.edu	(650) 723-3525

* through September 2004

12 Cassini Principal Investigators and Team Leaders (PIs/TLs) Archive Contacts

Instrument	Instrument Team Archive Representative(s)	Email	Phone Number	PI or TL
CAPS Cassini Plasma Spectrometer	Charles Zinsmeyer Judy Furman	CZinsmeyer@swri.edu jfurman@swri.edu	(210) 522-5018 (210) 522-6040	David Young, PI
CDA Cosmic Dust Analyzer	Sascha Kempf	Sascha.Kempf@mpi-hd.mpg.de	49 6221 51 6247	Ralf Srama, PI
CIRS Composite Infrared Spectrometer	Conor Nixon Jim Tingley	nixon@cirsrss.gsfc.nasa.gov James.S.Tingley@gsfc.nasa.gov	(301) 286-6757 (301) 286-4980	Michael Flasar, PI
INMS Ion and Neutral Mass Spectrometer	Greg Fletcher Dave Gell	gfletch@umich.edu gellda@umich.edu	(734) 763-8182 (734) 763-6221	Hunter Waite, TL
ISS Imaging Science Subsystem	Leslie Pieri Ben Knowles Josh Riley	Leslie@ciclops.org knowles@ciclops.org josh@ciclops.org	(830) 693-8955 (720) 974-5852 (720) 974-5856	Carolyn Porco, TL
MAG Magnetometer	Nick Achilleos Steve Kellock	n.achilleos@imperial.ac.uk s.kellock@imperial.ac.uk	44 207 594 7759 44 207 594 7760	Michele Dougherty, PI
MIMI Magnetospheric Imaging Instrument	Don Mitchell Thomas Armstrong	Don.Mitchell@jhuapl.edu Armstrong@FTECS.com	(240) 228-5981 (785) 840-0800	Tom Krimigis, PI
RADAR	Bryan Stiles Rich West Randy Kirk	Bryan.Stiles@jpl.nasa.gov Richard.D.West@jpl.nasa.gov rkirk@usgs.gov	(818) 354-5329 (818) 354-6025 (520) 556-7020	Charles Elachi, TL
RPWS Radio and Plasma Wave Spectrometer	Bill Kurth	william-kurth@uiowa.edu	(319) 335-1926	Don Gurnett, PI

Instrument	Instrument Team Archive Representative(s)	Email	Phone Number	PI or TL
RSS Radio Science Subsystem	Operations: Elias Barbinis Gene Goltz Science: Dick French	Elias.Barbinis@jpl.nasa.gov Gene.Goltz@jpl.nasa.gov rfrench@wellesley.edu	(818) 393-0661 (818) 393-1142 (781) 283-3747	Arv Kliore, TL
UVIS Ultraviolet Imaging Spectrograph	David Judd	David.Judd@lasp.colorado.edu	(303) 492-8582	Larry Esposito, PI
VIMS Visual and Infrared Mapping Spectrometer	Rick McCloskey John Ivens	rickm@lpl.arizona.edu jivens@lpl.arizona.edu	(520) 626-3255 (520) 621-7301	Robert Brown, TL

13 Cassini Interdisciplinary Scientists

Discipline	Name	Email	Phone Number
Solar Wind	Darrell F. Strobel	strobel@jhu.edu	(410) 516-7829
Atmospheres	Tobias C. Owen	owen@ifa.hawaii.edu	(808) 956-8007
Magnetospheres/Plasma Physics	Michel Blanc	blanc@obs-mip.fr	33 561 33 2948
Rings	Jeffrey N. Cuzzi	jcuzzi@mail.arc.nasa.gov	650 604-6343/5524
Magnetospheres/Plasma Physics	Tamas I. Gombosi	tamas@umich.edu	(734) 764-7222
Satellites	Laurence A. Soderblom	lsoderblom@usgs.gov	(928) 556-7018

14 SPICE Archive Contact

Dataset	Team	Archive Representative
SPICE	SAUL/IO Science and Uplink Office / Instrument Operations Element	Diane Conner Diane.Conner@jpl.nasa.gov (818) 354-8586

PDS Discipline Nodes Responsible for Archiving Data by Instrument

Instrument teams submit archives to the primary nodes for distribution within the PDS and to NSSDC.

Instrument	Primary Node	Secondary Node
CAPS	PPI	N/A
CDA	Small Bodies	Rings, PPI
CIRS	Atmospheres	Rings
INMS	PPI	Atmospheres
ISS	Imaging / JPL	Rings, Geosciences, Atmospheres
MAG	PPI	N/A
MIMI	PPI	Atmospheres
RADAR	Imaging/ USGS	Geosciences, Rings
RPWS	PPI	N/A
RSS	Radio Science subnode	All
UVIS	Atmospheres	Rings
VIMS	Imaging / JPL	Rings, Atmospheres
SPICE	NAIF	
Huygens ACP DISR DWE GCMS HASI SSP	Atmospheres	Geosciences

16 Data Product Levels

There is no official reference for the NASA product level descriptions. The source for the NASA product level descriptions found below was taken from a Mars project archive plan. CODMAC descriptions were taken from the "Issues and Recommendations Associated with Distributed Computation and Data Management Systems for Space Sciences", Committee on Data Management and Computation Space Science Board Commission on Physical Sciences, Mathematics, and Resources National Research Council, PB88-1884466, 1986.

NASA Levels	Product Description	CODMAC Equivalent
Raw	Telemetry data stream as received at the ground station, with science and engineering data embedded.	Level 1 – Raw Data
Level 0	Instrument science data (e.g., raw voltages, counts) at full resolution, time ordered, with duplicates and transmission errors removed.	Level 2 – Edited Data
Level 1A	Level 0 data that have been located in space and may have been reversibly transformed (e.g., calibrated, rearranged) in a reversible manner and packaged with needed ancillary and auxiliary data (e.g., radiances with the calibration equations applied). No resampling.	Level 3 – Calibrated
Level 1B	Irreversibly transformed (e.g., resampled, remapped, calibrated) values of the instrument measurements (e.g., radiances magnetic field strength).	Level 3 – Calibrated Level 4 – Resampled data
Higher levels	Geophysical parameters mapped into uniform space time grids.	Level 5 – Derived data
		Level 6 – Ancillary Data

CODMAC Equivalent	CODMAC Description
Level 1 – Raw Data	Telemetry data with data embedded.
Level 2 – Edited Data	Corrected for telemetry errors and split or decommutated into a dataset for a given instrument. Sometimes called Experimental Data Record. Data are also tagged with time and location of acquisition.
Level 3 – Calibrated	Edited data that are still in units produced by instrument, but that have been corrected so that values are expressed in or are proportional to some physical unit such as radiance. No resampling, so edited data can be reconstructed.
Level 4 – Resampled data	Data that have been resampled in the time or space domains in such a way that the original edited data cannot be reconstructed. Could be calibrated in addition to being resampled.
Level 5 – Derived data	Derived results, as maps, reports, graphics, etc. NASA Levels 2 through 5.
Level 6 – Ancillary Data	Non-science data needed to generate calibrated or resampled datasets. Consists of instrument gains, offsets; pointing information for scan platforms, etc

Appendix A: Cassini Science and Ancillary Datasets to be archived with PDS by Instrument Teams

The Appendix A will be periodically updated to add or modify products as needed then posted for electronic access on the Cassini archive web site.

	Standard_data_product_id	Science Data Product Description	Product Specification ID (SIS)	CODMAC Level	PDS Format IMG, etc..	Prime PDS Node Interface	Producer	Supplier to PDS	Estimated Data Set Size	Data Set ID
1	CAPS_ACT	Actuator Data Files	IO-AR-017	2	BINARY	PPI	J. Furman	J. Furman	132MB/Year = 528 MB	CO-E/J/S/SW-CAPS-2-UNCALIBRATED-V1.0
2	CAPS_ELS	Electron sensor data	IO-AR-017	2	BINARY	PPI	J. Furman	J. Furman	9.3GB/Year = 37.1 GB	CO-E/J/S/SW-CAPS-2-UNCALIBRATED-V1.0
3	CAPS_ANC	Ancillary information	IO-AR-017	2	BINARY	PPI	J. Furman	J. Furman	138MB/Year = 550 MB	CO-E/J/S/SW-CAPS-2-UNCALIBRATED-V1.0
4	CAPS_IBS	Ion Beam sensor data	IO-AR-017	2	BINARY	PPI	J. Furman	J. Furman	32GB/Year =	CO-E/J/S/SW-CAPS-2-UNCALIBRATED-V1.0
5	CAPS_IMS_EVN	IMS event data	IO-AR-017	2	BINARY	PPI	J. Furman	J. Furman	??	CO-E/J/S/SW-CAPS-2-UNCALIBRATED-V1.0
6	CAPS_IMS_LOG	Ion Mass logicals	IO-AR-017	27	BINARY	PPI	J. Furman	J. Furman	4.2GB/Year = 16.7 GB	CO-E/J/S/SW-CAPS-2-UNCALIBRATED-V1.0
7	CAPS_IMS_SNG	Ion Mass singles	IO-AR-017	2	BINARY	PPI	J. Furman	J. Furman	5GB/Year= 20 GB	CO-E/J/S/SW-CAPS-2-UNCALIBRATED-V1.0
8	CAPS_IMS_ION	Ion Mass Ion data	IO-AR-017	2	BINARY	PPI	J. Furman	J. Furman	137GB/Year= 548 GB	CO-E/J/S/SW-CAPS-2-UNCALIBRATED-V1.0
9	CAPS_IMS_TOF	Ion Mass Time of Flight data	IO-AR-017	2	BINARY	PPI	J. Furman	J. Furman	485MB/Year = 2 GB	CO-E/J/S/SW-CAPS-2-UNCALIBRATED-V1.0
10	CDA_PNT	J2000 Pointing vector of instrument as a function of time when CDA is on	IO-AR-012	3	table	SBN	S. Kempf	S. Kempf	4 GB	CO-D-CDA-3/4/5-DUST-V1.0
11	CDA_CAL_AREA	The sensitive area of the CDA impact detector (IID) and chemical analyser (CAT) is tabulated as a function of the incident angle with respect to the instrument axis.	IO-AR-012	3	table	SBN	S. Kempf	S. Kempf	10 KB	CO-D-CDA-3/4/5-DUST-V1.0
12	CDA_STAT	Cassini mission and CDA configuration, tests and other events. Records are triggered by change in status affecting the sensitivity of the different CDA instruments and mission events that may affect the interpretation of the data.	IO-AR-012	3	table	SBN	S. Kempf	S. Kempf	300 MB	CO-D-CDA-3/4/5-DUST-V1.0
13	CDA_DA_IMP	Detector responses and derived quantities from the Cassini dust detector as well as spacecraft geometry information for reliable impacts.	IO-AR-012	3	table	SBN	S. Kempf	S. Kempf	10 GB	CO-D-CDA-3/4/5-DUST-V1.0
14	CDA_MS_PEAKS	Time-of-flight mass spectra peaks for individual impact events.	IO-AR-012	3	table	SBN	S. Kempf	S. Kempf	1 GB	CO-D-CDA-3/4/5-DUST-V1.0
15	CDA_MS_SPECTRA	Time-of-flight mass spectra for individual impacts, identified by their unique identifier number xxxxxx	IO-AR-012	3	table	SBN	S. Kempf	S. Kempf	1 GB	CO-D-CDA-3/4/5-DUST-V1.0

Appendix A: Archive Plan for Science Data, 699-068, June 2004

	Standard_data_product_id	Science Data Product Description	Product Specification ID (SIS)	CODMAC Level	PDS Format IMG, etc..	Prime PDS Node Interface	Producer	Supplier to PDS	Estimated Data Set Size	Data Set ID
16	CDA_CAL_SET	Table of voltages corresponding to voltage level codes and Coulomb threshold settings.	IO-AR-012	3	tables	SBN	S. Kempf	S. Kempf	20 KB	CO-D-CDA-3/4/5-DUST-V1.0
17	CDA_DA_CTR	CDA impact counter time history file.	IO-AR-012	6	table	SBN	S. Kempf	S. Kempf	1 GB	CO-D-CDA-3/4/5-DUST-V1.0
18	CDA_HRD	HRD data and ancillary files - HRD takes data only during Saturn ring plane crossings	IO-AR-012	3	table	SBN	S. Kempf	S. Kempf	TBD	CO-D-CDA-3/4/5-DUST-V1.0
19	CIRS_IHSK	Resampled (interpolated) housekeeping data	IO-AR-002, IO-AR-003	3	table	Atmos	CIRS	CIRS PI	3.5 MB/mon = 168 MB	CO-S-CIRS-2/4-TSDR-V1.0
20	CIRS_GEO	spacecraft orientation w.r.t. target, sun	IO-AR-002, IO-AR-003	2	table	Atmos	CIRS	CIRS PI	41 MB/mon = 2.0 GB	CO-S-CIRS-2/4-TSDR-V1.0
21	CIRS_HSK	Housekeeping Data	IO-AR-002, IO-AR-003	2	table	Atmos	CIRS	CIRS PI	18.5 MB/mon = 890 MB	CO-S-CIRS-2/4-TSDR-V1.0
22	CIRS_IFGM	uncompressed, raw interferogram data	IO-AR-002, IO-AR-003	2	table	Atmos	CIRS	CIRS PI	682 MB/mon = 32.7 GB	CO-S-CIRS-2/4-TSDR-V1.0
23	CIRS_OBS	observation parameters	IO-AR-002, IO-AR-003	2	table	Atmos	CIRS	CIRS PI	1 MB/mon = 48 MB	CO-S-CIRS-2/4-TSDR-V1.0
24	CIRS_POI	pointing information for detectors on target	IO-AR-002, IO-AR-003	2	table	Atmos	CIRS	CIRS PI	236 MB/mon = 11.3 GB	CO-S-CIRS-2/4-TSDR-V1.0
25	CIRS_RIN	pointing information for detectors on rings	IO-AR-002, IO-AR-003	2	table	Atmos	CIRS	CIRS PI	200 MB/mon = 9.6 GB	CO-S-CIRS-2/4-TSDR-V1.0
26	CIRS_AIFM	averaged reference interferograms (deep space, warm shutter)	IO-AR-002, IO-AR-003	4	table	Atmos	CIRS	CIRS PI	42.5 MB/mon = 2.0 GB	CO-S-CIRS-2/4-TSDR-V1.0
27	CIRS_ISPM	Calibrated individual spectra	IO-AR-002, IO-AR-003	4	table	Atmos	CIRS	CIRS PI	500 MB/mon = 24 GB	CO-S-CIRS-2/4-TSDR-V1.0
28	INMS_SCI	Science data, counts/sec	IO-AR-016	2	table	PPI	INMS	INMS	1600 MB	CO-EJS-INMS-2-SCI-U-V1.0
29	INMS_HKG	Housekeeping in engineering units	IO-AR-016	2	table	PPI	INMS	INMS	90 MB	CO-EJS-INMS-2-HKG-U-V1.0
30	INMS_OSI	Operations tables	IO-AR-016	2	table	PPI	INMS	INMS	10 MB	CO-EJS-INMS-2-OSI-U-V1.0
31	INMS_EVT	Event times	IO-AR-016	2	table	PPI	INMS	INMS	TBD	CO-EJS-INMS-2-EVT-U-V1.0
32	INMS_SMD	Science memory dump	IO-AR-016	2	table	PPI	INMS	INMS	TBD	CO-EJS-INMS-2-SMD-U-V1.0
33	INMS_HMD	Housekeeping memory dump	IO-AR-016	2	table	PPI	INMS	INMS	TBD	CO-EJS-INMS-2-HMD-U-V1.0
34	INMS_CNT	Science data, spectra with ancillary data	IO-AR-016	3	table	PPI	INMS	INMS	TBD	CO-EJS-INMS-3-CNT-C-V1.0
35	INMS_SPC	Science data, species	IO-AR-016	5	table	PPI	INMS	INMS	TBD	CO-EJS-INMS-5-SPC-C-V1.0
36	INMS_MSS	Science data, mass spectra	IO-AR-016	5	table	PPI	INMS	INMS	TBD	CO-EJS-INMS-5-MSS-C-V1.0
37	INMS_TTN	Science data, titan atmospheric profiles	IO-AR-016	5	table	PPI	INMS	INMS	TBD	CO-EJS-INMS-5-TTN-C-V1.0
38	ISS_EDR	Raw, uncalibrated images	DOIS-002, IO-AR-005	2	IMG	Imaging (JPL)	IO/MIPL	ISS TL	650 GB	CO-S-ISSNA/ISSWA-2-EDR-V1.0, CO-J-ISSNA/ISSWA-2-EDR-V1.0

Appendix A: Archive Plan for Science Data, 699-068, June 2004

	Standard_data_product_id	Science Data Product Description	Product Specification ID (SIS)	CODMAC Level	PDS Format IMG, etc..	Prime PDS Node Interface	Producer	Supplier to PDS	Estimated Data Set Size	Data Set ID
39	ISS_CAL	Calibration files, sample calibrated images	IO-AR-005	3	IMG, algorithms, software	Imaging (JPL)	ISS/CICLOPS	ISS TL	TBD	CO-X-ISSNA/ISSWA-2-CAL-V1.0
40	MAG_FGM	L1A fluxgate magnetometer data (duplicates removed, gaps filled, idiosyncrasies of onboard data processing unit fixed, data separated into files by type) 75 GB (combined size of FGM, VHM, SHM, CON, ANA, ERR, CMD, CHATT, CHUSR data)	IO-AR-020	2	Time series binary TABLE	PPI	MAG	MAG PI	75 GB (combined size of FGM, VHM, SHM, CON, ANA, ERR, CMD, CHATT, CHUSR data)	CO-E/SW/J/S-MAG-2-REDR-RAW-DATA-V1.0
41	MAG_VHM	L1A vector helium magnetometer data	IO-AR-020	2	Time series binary TABLE	PPI	MAG	MAG PI		CO-E/SW/J/S-MAG-2-REDR-RAW-DATA-V1.0
42	MAG_SHM	L1A scalar helium magnetometer data	IO-AR-020	2	Time series binary TABLE	PPI	MAG	MAG PI		CO-E/SW/J/S-MAG-2-REDR-RAW-DATA-V1.0
43	MAG_CON	L1A configuration image data	IO-AR-020	2	Time series binary TABLE	PPI	MAG	MAG PI		CO-E/SW/J/S-MAG-2-REDR-RAW-DATA-V1.0
44	MAG_ANA	L1A analog housekeeping data	IO-AR-020	2	Time series binary TABLE	PPI	MAG	MAG PI		CO-E/SW/J/S-MAG-2-REDR-RAW-DATA-V1.0
45	MAG_ERR	L1A error counter data	IO-AR-020	2	Time series binary TABLE	PPI	MAG	MAG PI		CO-E/SW/J/S-MAG-2-REDR-RAW-DATA-V1.0
46	MAG_CMD	L1A command validation data	IO-AR-020	2	Time series binary TABLE	PPI	MAG	MAG PI		CO-E/SW/J/S-MAG-2-REDR-RAW-DATA-V1.0
47	MAG_CHATT	L1A Cassini attitude data	IO-AR-020	2	Time series binary TABLE	PPI	MAG	MAG PI		CO-E/SW/J/S-MAG-2-REDR-RAW-DATA-V1.0
48	MAG_CHUSR	L1A engineering data from a user-selected set of channels	IO-AR-020	2	Time series binary TABLE	PPI	MAG	MAG PI		CO-E/SW/J/S-MAG-2-REDR-RAW-DATA-V1.0
49	MAG_CAL	Calibration files	IO-AR-020	2	binary TABLE	PPI	MAG	MAG PI	500 MB	CO-E/SW/J/S-MAG-2-REDR-RAW-DATA-V1.0
50	MAG_SW	software to convert L1A to L1B	IO-AR-020	6	TEXT, binary FILE	PPI	MAG	MAG PI	500 MB	CO-E/SW/J/S-MAG-2-REDR-RAW-DATA-V1.0
51	MAPS_KEY_PARAMETERS	MAPS instruments key parameters dataset - may contain plots and model data	IO-AR-004	4	ascii	PPI	MAPS Instrument teams	Univ of Michigan	28 GB	CO-V/E/J/S/SS-RFWS-4-SUMM-KEY60S-V1.0 CO-V/E/J/S/SS-MAG-4-SUMM-KEY60S-V1.0 CO-V/E/J/S/SS-MIMI-4-SUMM-KEY-5MIN-V1.0 CO-V/E/J/S/SS-CAPS-5-DDR-KEY-5MIN-V1.0 CO-S-INMS-5-DDR-KEY-5MIN-V1.0
52	MIMI_CHEMS_PHA	CHEMS Pulse Height Analysis data	IO-AR-006	2	ASCII	PPI	MIMI	MIMI PI	450 MB / Day Maximum = 722 GB	CO-E/J/S-MIMI-2-CHEMS-UNCALIBRATED-V1.0
53	MIMI_CHEMS_ACC	CHEMS accumulation rate data	IO-AR-006	2	ASCII	PPI	MIMI	MIMI PI	7 MB / Day Maximum = 12 GB	CO-E/J/S-MIMI-2-CHEMS-UNCALIBRATED-V1.0
54	MIMI_CHEMS_SCI	CHEMS science rate data	IO-AR-006	2	ASCII	PPI	MIMI	MIMI PI		CO-E/J/S-MIMI-2-CHEMS-UNCALIBRATED-V1.0

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	Standard_data_product_id	Science Data Product Description	Product Specification ID (SIS)	CODMAC Level	PDS Format IMG, etc..	Prime PDS Node Interface	Producer	Supplier to PDS	Estimated Data Set Size	Data Set ID
55	MIMI_INCA_PHA	INCA Pulse Height Analysis data	IO-AR-006	2	ASCII	PPI	MIMI	MIMI PI	300 MB / Day Maximum = 482 GB	CO-E/J/S-MIMI-2-INCA-UNCALIBRATED-V1.0
56	MIMI_INCA_RAT	INCA accumulation rate data	IO-AR-006	2	ASCII	PPI	MIMI	MIMI PI	4 MB / Day Maximum = 6.5 GB	CO-E/J/S-MIMI-2-INCA-UNCALIBRATED-V1.0
57	MIMI_INCA_IMG	INCA image data	IO-AR-006	2	ASCII	PPI	MIMI	MIMI PI	110 MB / Day Maximum = 177 GB	CO-E/J/S-MIMI-2-INCA-UNCALIBRATED-V1.0
58	MIMI_LEMMS_PHA	LEMMS Pulse Height Analysis data	IO-AR-006	2	ASCII	PPI	MIMI	MIMI PI	30 MB / Day Maximum = 49 GB	CO-E/J/S-MIMI-2-LEMMS-UNCALIBRATED-V1.0
59	MIMI_LEMMS_ACC	LEMMS accumulation rate data	IO-AR-006	2	ASCII	PPI	MIMI	MIMI PI	35 MB / Day Maximum = 57 GB	CO-E/J/S-MIMI-2-LEMMS-UNCALIBRATED-V1.0
60	MIMI_LEMMS_FRT	LEMMS fine accumulation rate data	IO-AR-006	2	ASCII	PPI	MIMI	MIMI PI		CO-E/J/S-MIMI-2-LEMMS-UNCALIBRATED-V1.0
61	RADAR_SBDP	Short Burst Data Record. Time ordered tabular data records including engineering telemetry, spacecraft geometry, calibrated science data (radiometry, scatterometry, and altimetry) and associated meta data. Also includes time-ordered SAR metadata.	DORA-001 DORA-002	3	table	Imaging	IO/RADAR	Radar TL	1100 MB	CO-V/E/J/S-RADAR-3-SBDP-V1.0
62	RADAR_LBDR	Same as RADAR_SBDP with addition of sample radar echo data for each burst.	DORA-001 DORA-002	3	table	Imaging	IO/RADAR	Radar TL	44000 MB	CO-V/E/J/S-RADAR-3-LBDR-V1.0
63	RADAR_ABDR	Same as RADAR_SBDP with addition of altimeter profile vector (range compressed echo data) for each burst.	DORA-001 DORA-002	3	table	Imaging	IO/RADAR	Radar TL	4800 MB	CO-SSA-3-ABDR-V1.0
64	RADAR_BIDR	Basic Image Data Record. SAR data correlated, resampled to oblique cylindrical grid (different projection for each swath), looks summed. Includes latitude, longitude, incidence angle, and beam mask back-planes.	DORA-002 DORA-003	5	IMG	Imaging	IO/RADAR	Radar TL	5600 MB	CO-SSA-RADAR-5-BIDR-V1.0
65	RADAR_PRDR	Calibrated & gridded radiometer data	IO-AR-012 IO-AR-018	5	IMG	Imaging	USGS	Radar TL	300 MB	CO-SSA-RADAR-5-PRDR-V1.0
66	RADAR_PSDR	Calibrated & gridded scatterometer data	IO-AR-012 IO-AR-018	5	IMG	Imaging	USGS	Radar TL	300 MB	CO-SSA-RADAR-5-PSDR-V1.0
67	RADAR_GRDR	Mosaicked radiometer data	IO-AR-012 IO-AR-018	5	IMG	Imaging	USGS	Radar TL	100 MB	CO-SSA-RADAR-5-GRDR-V1.0
68	RADAR_MIDR	Mosaicked SAR image data	IO-AR-012 IO-AR-018	5	IMG	Imaging	USGS	Radar TL	6500 MB	CO-SSA-RADAR-5-MIDR-V1.0
69	RADAR_RIDR	Multilook SAR "cubes"	IO-AR-012 IO-AR-018	5	IMG	Imaging	USGS	Radar TL	50 MB	CO-SSA-RADAR-5-RIDR-V1.0
70	RADAR_DTM	Digital Topographic Models (DTMs)	IO-AR-012 IO-AR-018	5	IMG	Imaging	USGS	Radar TL	10 MB	CO-SSA-RADAR-5-DTM-V1.0

Appendix A: Archive Plan for Science Data, 699-068, June 2004

	Standard_data_product_id	Science Data Product Description	Product Specification ID (SIS)	CODMAC Level	PDS Format IMG, etc..	Prime PDS Node Interface	Producer	Supplier to PDS	Estimated Data Set Size	Data Set ID
71	RPWS_KEY_PARAMETERS	spectral information as a function of time	IO-AR-019	4	ascii	PPI	RPWS	RPWS	4 GB	CO-V/E/J/S/SS-RPWS-4-SUMM-KEY60S-V1.0
72	RPWS_ANCIL	Description of RPWS IEBs	IO-AR-019	6	ascii	PPI	RPWS	RPWS	<1 MB	CO-V/E/J/S/SS-RPWS-4-SUMM-KEY60S-V1.0, CO-V/E/J/S/SS-RPWS-2-REFDR-ALL-V1.0, CO-V/E/J/S/SS-RPWS-3-RDR-LRFULL-V1.0, CO-V/E/J/S/SS-RPWS-2-REFDR-WBRFULL-V1.0, CO-V/E/J/S/SS-RPWS-2-REFDR-WFRFULL-V1.0
73	RPWS_RAW_COMPLETE	Raw telemetry data, edited	IO-AR-019	2	BINARY	PPI	RPWS	RPWS	65 GB	CO-V/E/J/S/SS-RPWS-2-REFDR-ALL-V1.0
74	RPWS_WIDEBAND_FULL	Wideband Full Resolution Uncalibrated	IO-AR-019	2	Time Series	PPI	RPWS	RPWS	10 GB	CO-V/E/J/S/SS-RPWS-2-REFDR-WBRFULL-V1.0
75	RPWS_WAVEFORM_FULL	Waveform Full Resolution Uncalibrated	IO-AR-019	2	Time Series	PPI	RPWS	RPWS	10 GB	CO-V/E/J/S/SS-RPWS-2-REFDR-WFRFULL-V1.0
76	RPWS_LOW_RATE_FULL	Low Rate Full Resolution Calibrated	IO-AR-019	3	Time Series	PPI	RPWS	RPWS	65 GB	CO-V/E/J/S/SS-RPWS-3-RDR-LRFULL-V1.0
77	RPWS_LOW_RATE_BROWSE	Low Rate Browse	IO-AR-019	3	PNG	PPI	RPWS	RPWS	6.5 GB	CO-V/E/J/S/SS-RPWS-3-RDR-LRFULL-V1.0
78	RPWS_WIDEBAND_BROWSE	Wideband Browse	IO-AR-019	2	PNG	PPI	RPWS	RPWS	1 GB	CO-V/E/J/S/SS-RPWS-2-REFDR-WBRFULL-V1.0
79	RPWS_WAVEFORM_BROWSE	Waveform Browse	IO-AR-019	2	PNG	PPI	RPWS	RPWS	1 GB	CO-V/E/J/S/SS-RPWS-2-REFDR-WFRFULL-V1.0
80	RPWS_SP	Special Data Sets	IO-AR-019	4+		PPI	RPWS	RPWS	1 GB	CO-V/E/J/S/SS-RPWS-4-SP-V1.0
81	RSS_ATMOS_OCCULT	complex signal amplitude $A(f,r,\lambda,t)$ for frequency f at ring plane (model-independent quantity) radius r , longitude λ , and time t (direct ray) (model-independent quantity) Fresnel scale $Fr(f,r,\lambda,t)$ (model-independent quantity) range to ring intercept pt of center of beam $R(t)$ (model-independent quantity) transverse and radial velocity components of direct ray (model-independent quantity) normal and slant path optical depth $\tau(f,r,\lambda,t)$ at multiple resolutions (derived quantities) Spectrograms of scattered signal as function of time (derived quantities)	IO-AR-022	5		RS Subnode	Radio Science Team (RST)	RST	N/A	CO-X-RSS-5-EXP-V1.0
82	RSS_GRAV_FIELDS	frequency residuals vs time (model-independent quantity) covariance matrix (derived) reconstructed trajectory vs time (derived)	IO-AR-022	5		RS Subnode	Radio Science Team (RST)	RST	N/A	CO-X-RSS-5-EXP-V1.0

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	Standard_data_product_id	Science Data Product Description	Product Specification ID (SIS)	CODMAC Level	PDS Format IMG, etc..	Prime PDS Node Interface	Producer	Supplier to PDS	Estimated Data Set Size	Data Set ID
83	RSS_RING_OCCULT	complex signal amplitude $A(f,r,\lambda,t)$ for frequency f at ring plane radius r , longitude λ , and time t (direct ray) (model-independent quantity) Fresnel scale $Fr(f,r,\lambda,t)$ (model-independent quantity) range to ring intercept pt of center of beam $R(t)$ (model-independent quantity) transverse and radial velocity components of direct ray (model-independent quantity) normal and slant path optical depth $\tau(f,r,\lambda,t)$ at multiple resolutions (derived quantities) Spectrograms of scattered signal as function of time (derived quantities)	IO-AR-022	5		RS Subnode	Radio Science Team (RST)	RST	N/A	CO-X-RSS-5-EXP-V1.0
84	RSS_SC_GWE	sky frequency at 1 sec interval (90% level of completeness) for each observed frequency [1GB ascii file for 40 days of obs]	IO-AR-022	5		RS Subnode	Radio Science Team (RST)	RST	N/A	CO-X-RSS-5-EXP-V1.0
85	RSS_ODF	Closed-loop Orbit Data File (ODF); Doppler, range, and ramps	DSN-001 IO-AR-021	4	Binary	RS Subnode	RMDCT	RST	2 GB	CO-X-RSS-1-EXP-V1.0
86	RSS_EOP	EOP - Earth Orientation Parameters File	DSN-004 IO-AR-021	6	ASCII	RS Subnode	TSAC	RST	250 MB	CO-X-RSS-1-EXP-V1.0
87	RSS_MCF	MCF - Media Calibration Files	DSN-005 IO-AR-021	6	ASCII	RS Subnode	TSAC	RST	2 MB	CO-X-RSS-1-EXP-V1.0
88	RSS_PDD	[Advanced Media Calibration System] Path Delay Data (PDD)	DSN-005 IO-AR-021	6	ASCII	RS Subnode	IO-RS	RST	1 GB	CO-X-RSS-1-EXP-V1.0
89	RSS_ATDF	Closed-loop Archival Tracking Data File (ATDF); Doppler, range, and ramps	DSN-023 IO-AR-021	2	Binary	RS Subnode	Radio Metric Data Conditioning Team (RMDCT)	RST	10 GB	CO-X-RSS-1-EXP-V1.0
90	RSS_TDAF	Closed Tracking Data Archival File (TDAF); up-link and downlink carrier and range phase	DSN-025 IO-AR-021	1,2,3,4	Binary	RS Subnode	Tracking Data Delivery Subsystem (TDDS)	RST	3 GB	CO-X-RSS-1-EXP-V1.0
91	RSS_RSR	Open-loop Radio Science Data (ODS), from RSR; digitized signal	DSN-026 IO-AR-021	1	Binary	RS Subnode	IO-RS *	RST	200 GB	CO-X-RSS-1-EXP-V1.0
92	RSS_MON	Mission Monitor Data	DSN-027 IO-AR-021	6	ASCII	RS Subnode	IO-RS	RST	13 GB	CO-X-RSS-1-EXP-V1.0
93	RSS_HGA_CAL	High Gain Antenna (HGA) Boresight Alignment reports	IO-AR-021	6	ASCII	RS Subnode	IO-RS	RST	N/A	CO-X-RSS-1-EXP-V1.0
94	RSS_HGA_PAT	High Gain Antenna (HGA) Pattern reports	IO-AR-021	6	ASCII	RS Subnode	IO-RS	RST	N/A	CO-X-RSS-1-EXP-V1.0
95	RSS_USO_CAL	Ultrastable Oscillator Characterization reports	IO-AR-021	6	ASCII	RS Subnode	IO-RS	RST	N/A	CO-X-RSS-1-EXP-V1.0

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	Standard_data_product_id	Science Data Product Description	Product Specification ID (SIS)	CODMAC Level	PDS Format IMG, etc..	Prime PDS Node Interface	Producer	Supplier to PDS	Estimated Data Set Size	Data Set ID
96	RSS_CK	C-Kernel	NAV-005 IO-AR-021	6	Binary	RS Subnode	SCO	RST	1 GB	CO-X-RSS-1-EXP-V1.0
97	RSS_SPK	SP-Kernel; spacecraft and planetary ephemerides	NAV-009 IO-AR-021	6	Binary	RS Subnode	SCO	RST	400 MB	CO-X-RSS-1-EXP-V1.0
98	RSS_TLM	RFS/RFIS engineering telemetry	TLM-007 IO-AR-021	6	ASCII	RS Subnode	IO-RS	RST	31 GB	CO-X-RSS-1-EXP-V1.0
99	UVIS_1WAV	Image at one wavelength	IO-AR-023 IO-AR-024	2	Image	Atmos	UVIS	UVIS PI	34 MB	CO-S-UVIS-2-WAV-V1.0
100	UVIS_CUBE	Spatial and spectral cubes	IO-AR-023 IO-AR-024	2	Cube	Atmos	UVIS	UVIS PI	34 GB	CO-S-UVIS-2-CUBE-V1.0
101	UVIS_SPEC	Spectra	IO-AR-023 IO-AR-024	2	Spectrum	Atmos	UVIS	UVIS PI	136 MB	CO-S-UVIS-2-SPEC-V1.0
102	UVIS_SSB	Solar and Stellar brightness time history	IO-AR-023 IO-AR-024	2	Time Series	Atmos	UVIS	UVIS PI	2 MB	CO-S-UVIS-2-SSB-V1.0
103	UVIS_CAL	Calibration files, algorithms and calibrated data examples	IO-AR-023 IO-AR-024	6	Cube, algorithms, etc..	Atmos		UVIS	2 GB	CO-S-UVIS-2-CAL-V1.0
104	VIMS_EDR	Image cube of visible bands	DOVI-002, IO-AR-009	3	PDS Spectral Cube	Imaging (JPL)	IO/MIPS	VIMS Team	125 GB	CO-S-VIMS-3-CUBE-V1.0 CO-J/JSA-VIMS-3-CUBE-V1.0 CO-X-VIMS-3-CUBE-V1.0
105	SPICE_HUYSPK	Spacecraft, Planet, satellite, and rock ephemerides	NAV-009	6	SPICE	NAIF	NAVT & ISS	Instrument Ops	5 GB in ascii	HP-SSA-SPICE-6-V1.0
106	SPICE_SPK	Spacecraft, Planet, satellite, and rock ephemerides	NAV-009	6	SPICE	NAIF	NAVT & ISS	Instrument Ops	5 GB in ascii	CO-S/J/E/V-SPICE-6-V1.0
107	SPICE_PCK	Planetary Constants and basic models	NAV-010	6	SPICE	NAIF	MP	Instrument Ops	2 MB	CO-S/J/E/V-SPICE-6-V1.0
108	SPICE_IK	Instrument description and frame definitions	DOI-002	6	SPICE	NAIF	NAIF	Instrument Ops	2 MB	CO-S/J/E/V-SPICE-6-V1.0
109	SPICE_CK	Pointing	MSAS-005	6	SPICE	NAIF	SCO/AACS	Instrument Ops	3.3 MB/Day = 6 GB in ascii	CO-S/J/E/V-SPICE-6-V1.0
110	SPICE_EK	Events	DOI-001	6	SPICE	NAIF	Instrument Ops	Instrument Ops	500 MB	CO-S/J/E/V-SPICE-6-V1.0
111	SPICE_LSK	Leapseconds	MSAS-019	6	SPICE	NAIF	IO/NAIF	Instrument Ops	5 KB	CO-S/J/E/V-SPICE-6-V1.0
112	SPICE_SCLK	spacecraft clock offset	MSAS-017	6	SPICE	NAIF	SCO	Instrument Ops	3 MB	CO-S/J/E/V-SPICE-6-V1.0
113	SPICE_FK	Frames	DOI-035	6	SPICE	NAIF	Instrument Ops	Instrument Ops	500 MB	CO-S/J/E/V-SPICE-6-V1.0

18 Appendix B: Archive Delivery Schedule

The below delivery schedule applies to data products identified in the Appendix A that are classified as CODMAC levels 4 and below. Higher level products are archived with the PDS on a best efforts basis on a schedule developed by the producing team.

Data Collection Interval		Delivery to the PDS Required by the First Day of:
From First Day of:	Through Last Day of:	
Oct 1997	Jun 2004	Jul 2005
Jul 2004	Sep 2004	Jul 2005
Oct 2004	Dec 2004	Oct 2005
Jan 2005	Mar 2005	Jan 2006
Apr 2005	Jun 2005	Apr 2006
Jul 2005	Sep 2005	Jul 2006
Oct 2005	Dec 2005	Oct 2006
Jan 2006	Mar 2006	Jan 2007
Apr 2006	Jun 2006	Apr 2007
Jul 2006	Sep 2006	Jul 2007
Oct 2006	Dec 2006	Oct 2007
Jan 2007	Mar 2007	Jan 2008
Apr 2007	Jun 2007	Apr 2008
Jul 2007	Sep 2007	Jul 2008
Oct 2007	Jul 2008	Sep 2008

19 Appendix C: Acronyms

ACP	Aerosol Collector and Pyrolyser
APSD	Archive Plan for Science Data (formerly known as the Archive Policy and Data Transfer Plan, APDTP)
ASCII	American Standard Code for Information Interchange
ATM	Atmospheres
CAPS	Cassini Plasma Spectrometer
CD	Compact Disc
CDA	Cosmic Dust Analyzer
CD-ROM	Compact Disc – Read Only Memory
CEL	Cassini Electronic Library
CIRS	Composite Infrared Spectrometer
CK	SPICE spacecraft orientation data
CN	Central Node
CO	Cassini Orbiter
CODMAC	Committee on Data Management and Computation
Co-I	Co-Investigator
DISR	Descent Imager / Spectral Radiometer
DN	Discipline Node
DVD	Digital Versatile Disc the next generation of optical disc storage technology
DWE	Doppler Wind Experiment
EK	SPICE events information
ESA	European Space Agency
FK	SPICE Frames Kernel
GCMS	Gas Chromatograph Mass Spectrometer
GMT	Greenwich mean time
GWE	Gravity Wave Experiment
HASI	Huygens Atmospheric Structure Instrument
HP	Huygens Probe
HSWT	Huygens Science Working Team
IAG	International Association of Geodesy
IAU	International Astronomical Union
IAU	International Astronomical Union
IDS	Interdisciplinary Scientist
IEEE	Institute of Electrical and Electronics Engineers
IK	SPICE instrument Kernel
INMS	Ion and Neutral Mass Spectrometer
IO	Instrument Operations Team
IRD	Interface Requirements Document
ISS	Imaging Science Subsystem
JPL	Jet Propulsion Laboratory
LEMMS	Low Energy Magnetospheric Measurement System
LSK	SPICE leapseconds data
MAG	Magnetometer
MAPS	Magnetosphere and Plasma Science
Mb	Megabits
MIMI	Magnetospheric Imaging Instrument
MIPS	Multimission Image Processing System
MSSO	Mission Science and Support Operations
NAIF	Navigation and Ancillary Information Facility
NASA	National Aeronautics and Space Administration
NSSDC	National Space Science Data Center
OIA	Operational Interface Agreement

OTL	Operations Team Leader
PCK	SPICE Planetary Constants Kernel
PDMP	Project Data Management Plan
PDS	Planetary Data System
PI	Principal Investigator
PPI	Planetary Plasma Interactions
PSG	Program Science Group
RPIF	Regional Planetary Image Facility
RPWS	Radio and Plasma Wave Spectrometer
RSS	Radio Science Subsystem
SAUL	Science and Uplink Office
SAWG	Science Archive Working Group
SCLK	SPICE spacecraft clock coefficients
SCLK	Spacecraft Clock
SIS	Software Interface Specification
SMP	Science Management Plan
SOI	Saturn Orbit Insertion
SPICE	Spacecraft, Planet, Instrument, C-matrix, Events (NAIF PDS Node)
SPK	SPICE Spacecraft and Planetary Kernel ephemerides
SSP	Surface Science Package
TBD	To Be Determined
Tbits	TerraBytesTerrabits
TL	Team Leader
UTC	Coordinated Universal Time
UVIS	Ultraviolet Imaging Spectrograph
VIMS	Visual and Infrared Mapping Spectrometer
WG	Working Group

20 Appendix D: Huygens Data Archive Generation, Validation and Transfer Plan